UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
2002/01364

February 12, 2003

Mr. Lawrence C. Evans
Portland District, Corps of Engineers
CENWP-OP-GP (Mr. Ron Marg)
P.O. Box 2946
Portland, OR 97208-2946

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat Consultation for the Port of Astoria Mobile Boat Hoist/Haulout Facility Project, Columbia River Basin, Clatsop County, Oregon (Corps No. 2002-00907)

Dear Mr. Evans:

Enclosed is a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) on the effects of the proposed Port of Astoria Mobile Boat Hoist/Haulout Facility Project in Clatsop County, Oregon. In this Opinion, NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of twelve ESA-listed salmonids, or destroy or adversely modify their designated critical habitat. As required by section 7 of the ESA, NOAA Fisheries included reasonable and prudent measures with nondiscretionary terms and conditions that NOAA Fisheries believes are necessary to minimize the impact of incidental take associated with this action.

This document also serves as consultation on essential fish habitat pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and implementing regulations (50 CFR Part 600).

Please direct any questions regarding this consultation to Robert Anderson of my staff in the Oregon Habitat Branch at 503.231.2226.

Sincerely,

For Michael R Crouse

D. Robert Lohn
Regional Administrator

Endangered Species Act - Section 7 Consultation
Biological Opinion

&

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

Port of Astoria Mobile Boat Hoist/Haulout Facility Project
Columbia River Basin
Clatsop County, Oregon
(Corps No. 2002-00907)

Agency: U.S. Army Corps of Engineers, Portland District

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Date Issued: February 12, 2003

Issued by: for Michael R Crouse
D. Robert Lohn
Regional Administrator

Refer to: 2002/01364

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1. INTRODUCTION

1.1 Background

On November 29, 2002, the National Marine Fisheries Service (NOAA Fisheries) received a letter from the U.S. Army Corps of Engineers (Corps) requesting informal consultation pursuant to the Endangered Species Act (ESA), and for essential fish habtitat (EFH) consultation as required under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) for the issuance of a permit under section 10 of the Rivers and Harbors Act and section 404 of the Clean Water Act to the Port of Astoria (Port) to allow construction of the Mobile Boat Hoist/Haulout Facility on the Columbia River, Clatsop County, Oregon. NOAA Fisheries responded with a letter of nonconcurrence on December 19, 2002, indicating that consultation could not be completed until additional information was provided.

On February 6, 2002, NOAA Fisheries received a letter from the Corps revising the proposed action, providing the requested information, and requesting formal consultation. NOAA Fisheries considered the information sufficient to initiate formal consultation. The Corps determined the proposed action was likely to adversely affect the following ESA-listed species: Snake River (SR) steelhead (*Oncorhynchus mykiss*), Upper Columbia River (UCR) steelhead, Middle Columbia River MCR) steelhead, Upper Willamette River (UWR) steelhead, Lower Columbia River (LCR) steelhead, SR spring/summer-run chinook salmon (*O. tshawytscha*), SR fall-run chinook salmon, UCR spring-run chinook salmon, UWR chinook salmon, LCR chinook salmon, Columbia River (CR) chum salmon (*O. keta*), and SR sockeye salmon (*O. nerka*). The Corps also found the proposed project would adversely affect designated EFH.

1.2 Proposed Action

The proposed action is issuance of a permit by the Corps under section 10 of the Rivers and Harbors Act and section 404 of the Clean Water Act to authorize the Port to construct a mobile boat hoist/haulout facility at river mile 12.5 on the Columbia River. The mobile boat hoist/haulout facility consists of 20 steel pilings, 18 wooded bents, 18 batter pilings and 18 plumb pilings, as well as two concrete launching platforms. All wood proposed for construction would be untreated. Construction of the boat hoist/haulout facility would require installation of 20 steel pilings. Pile installation would be driven using a vibratory hammer. The steeling piling and wooden bents would support the launching platforms. Two pre-stressed concrete launching platforms (90 by 6 by 6 feet) would be fixed to the substructure. The total area of the proposed mobile boat hoist/haulout facility would measure approximately 3000 square feet (ft^2). The Port would remove a total of 92 creosote treated and untreated pilings. A steel hulled barge with a mounted crane would be used to perform all pile installation and removal. The barge would maintain a minimum of 10 feet (vertical distance) from the river bottom at all times.

The proposed action will require 10 days to complete. All in-water work is proposed to occur during the Oregon Department of Fish and Wildlife (ODFW)-recommended in-water work window [November 1 to February 28 (ODFW 2000)].

The purpose of the proposed project is to support marine related and water dependent uses at the Port of Astoria Docks (Piers one, two, and three).

2. ENDANGERED SPECIES ACT

2.1 Biological Opinion

2.1.1. Biological Information and Critical Habitat

This biological opinion (Opinion) considers the potential effects of the proposed action on SR steelhead, UCR steelhead, MCR steelhead, UWR steelhead, LCR steelhead, SR spring/summer-run chinook salmon, SR fall-run chinook salmon, UCR spring-run chinook salmon, UWR chinook salmon, LCR chinook salmon, CR chum salmon, and SR sockeye salmon. The subject action will occur within designated critical habitat for SR fall-run chinook, SR spring/summer-run chinook salmon, and SR sockeye salmon. Species' listing dates, critical habitat designations, and take prohibitions are listed in Table 1. The objective of this Opinion is to determine whether the proposed action is likely to jeopardize the continued existence of the ESA-listed species, or destroy or adversely modify designated critical habitat for SR fall-run chinook, SR spring/summer-run chinook salmon, and SR sockeye salmon. This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations, 50 CFR 402.

Based on migratory timing, listed salmon or steelhead species likely will be present in the action area during the proposed construction period. The proposed action would occur within designated critical habitat for SR fall-run chinook, SR spring/summer-run chinook salmon, and SR sockeye salmon.

For this project, NOAA Fisheries defines the action area as all riverine habitat accessible to the subject species in the Columbia River from river mile 13.0 to river mile 12.0, and includes the channel migration zone. The action area serves predominately as a migration corridor for both adult and juvenile salmon and steelhead, and secondarily as rearing and saltwater acclimation habitat.

Migration periods for steelhead occurs year-round, with peak smolt out-migration occurring May through June, and peak adult emigration occurring January through June.

Migration periods for sockeye salmon occurs April through August, with peak smolt out-migration occurring May through June, and peak adult emigration occurring June through July.

Migration periods for chinook salmon occurs year-round, with peak smolt out-migration occurring March through July, and peak adult emigration occurring March through October.

Migration periods for chum salmon occurs October through May, with peak smolt out-migration occurring March through May, and peak adult emigration occurring October through November.

Juvenile salmonid fishes, such as spring chinook, sockeye, and coho salmon and steelhead, usually move down river relatively quickly and in the main channel. Fall and summer chinook salmon are found in nearshore, littoral habitats and are particularly vulnerable to predation (Gray and Rondorf 1986). Juvenile salmonids (chinook and coho salmon) use backwater areas during their out-migration (Parente and Smith 1981). Lower Columbia River fall chinook and chum may arrive in the action area as early as late February (Herrmann 1970; Craddock, *et al.* 1976; Healey 1980; Congleton *et al.* 1981; Healey 1982; Dawley *et al.* 1986; Levings *et al.* 1986). These ocean-type subyearlings arrive in the lower river and estuarine portion of the action area at a small size. The earliest migrants can be a small as 30 to 40 millimeter (mm) fork length when they arrive because some of these fish hatch only a short distance from the action area; generally leaving the spawning area where they hatched within days to months following their emergence from the gravel and migrating downstream to and through the estuary. Consequently, subyearlings commonly spend weeks to months rearing within the action area prior to reaching the size at which they migrate to the ocean.

NOAA Fisheries designates critical habitat based on physical and biological features that are essential to the listed species. The essential features of designated critical habitat within the action area that support successful migration, smoltification, and rearing for ESA-listed salmonid fishes include: (1) Substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food (primarily juvenile), (8) riparian vegetation, (9) space, and (10) safe passage conditions. The proposed project may affect the following six essential features: Substrate, water quality, water velocity, food, space, and safe passage conditions resulting from the proposed action.

2.1.2 Evaluating Proposed Actions

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA (50 CFR 402). NOAA Fisheries must determine whether the action is likely to jeopardize the listed species. This analysis involves the initial steps of defining the biological requirements and current status of the listed species, and evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of mortality attributable to: (1) Collective effects of the proposed or continuing action; (2) the environmental baseline; and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmonid's life stages that occur beyond the action area. If NOAA Fisheries finds that the action is likely to jeopardize the listed species, it must identify reasonable and prudent alternatives to the action.

For the proposed action, NOAA Fisheries' jeopardy analysis considers direct or indirect mortality of fish attributable to the action. NOAA Fisheries considers the extent to which the proposed action impairs the function of essential elements necessary for juvenile and adult migration, spawning, and rearing of OC coho salmon under the existing environmental baseline. NOAA Fisheries' EFH analysis considers the effects of proposed actions on EFH and associated species and their life history stages, including cumulative effects and the magnitude of such effects.

2.1.2.1 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA to listed salmon is to define the biological requirements of the species most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list the subject species for ESA protection and also considers new data available that are relevant to the determination.

The relevant biological requirements are those necessary for the subject species to survive and recover to naturally-reproducing population levels at which protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

The biological requirements that are relevant to this consultation are adequate water quality, increased migration and spawning survival and improved habitat characteristics (including food availability and quality, and substrate composition) that function to support successful migration and rearing. The current status of the affected listed species, based upon their risk of extinction, has not significantly improved since these species were listed and, in some cases, their status may have worsened due to continuing downward trends toward extinction (see Table 1 for references).

Table 1. Endangered, Threatened, and Candidate Pacific Salmon Under NOAA Fisheries Jurisdiction in Columbia River Basin.

Evolutionarily Significant Unit	**Final Rule** E = Endangered T = Threatened C = Candidate	**Critical habitat (Final Rule)**	**Protective Regulations (Final Rule)**
Upper Columbia River Spring Chinook Salmon	E: March 24, 1999; 64 FR 14308	N/A	ESA section 9 applies
Snake River Fall Chinook Salmon	T: April 22, 1992; 57 FR 14653[1]	December 28, 1993; 58 FR 68543	April 22, 1992; 57 FR 14653
Snake River Spring/Summer Chinook Salmon	T: April 22, 1992; 57 FR 14653[1]	October 25, 1999; 64 FR 57399[2]	April 22, 1992; 57 FR 14653
Upper Willamette River Chinook Salmon	T: March 24, 1999; 64 FR 14308	N/A	July 10, 2000; 65 FR 42422
Lower Columbia River Chinook Salmon	T: March 24, 1999; 64 FR 14308	N/A	July 10, 2000; 65 FR 42422
Snake River Basin Steelhead	T: August 18, 1997; 62 FR 43937	N/A	July 10, 2000; 65 FR 42422
Middle Columbia River Steelhead	T: March 25, 1999; 64 FR 14517	N/A	July 10, 2000; 65 FR 42422
Upper Willamette River Steelhead	T: March 25, 1999; 64 FR 14517	N/A	July 10, 2000; 65 FR 42422
Lower Columbia River Steelhead	T: March 19, 1998; 63 FR 13347	N/A	July 10, 2000; 65 FR 42422
Upper Columbia River Steelhead	E: August 18, 1997; 62 FR 43937	N/A	ESA section 9 applies
Lower Columbia River/SW Washington Coho Salmon	C: July 25, 1995; 60 FR 38011	N/A	N/A
Columbia River Chum Salmon	T: March 25, 1999; 64 FR 14508	N/A	July 10, 2000; 65 FR 42422
Snake River Sockeye Salmon	E: November 20, 1991; 56 FR 58619	December 28, 1993; 58 FR 68543	ESA section 9 applies

2.1.2.2 Environmental Baseline

Naturally, the Columbia River is a very dynamic system. It has been affected and shaped over eons by a variety of natural forces, including volcanic activity, storms, floods, natural events, and climatological changes. These forces had and continue to have a significant influence on biological factors, habitat, inhabitants, and the whole riverine and estuarine environment of the Columbia River.

Over the past century, human activities have dampened the range of physical forces in the action area and resulted in extensive changes in the lower Columbia River and estuary. To a significant degree, the risk of extinction for salmon stocks in the Columbia River basin has increased because complex freshwater and estuarine habitats needed to maintain diverse wild populations and life histories have been lost and fragmented. Estuarine habitat has been lost or altered directly through diking, filling, and dredging. Estuarine habitat has also been removed indirectly through changes to flow regulation that affect sediment transport and salinity ranges of specific habitats within the estuary. Not only have rearing habitats been removed, but the connections among habitats needed to support tidal and seasonal movements of juvenile salmon have been severed.

The lower Columbia River estuary has lost approximately 43% of its historic tidal marsh (from 16,180 to 9,200 acres), and 77% of its historic tidal swamp habitats (from 32,020 to 6,950 acres) between 1870 and 1970 (Thomas 1983). One example is the diking and filling of floodplains formerly connected to the tidal river, which have resulted in the loss of large expanses of low-energy, off-channel habitat for salmon rearing and migrating during high flows. Similarly, diking of estuarine marshes and forested wetlands within the estuary have removed most of these important off-channel habitats. Sherwood *et al.* (1990) estimated that the Columbia River estuary lost 20,000 acres of tidal swamps, 10,000 acres of tidal marshes, and 3,000 acres of tidal flats between 1870 and 1970.

The total volume of the estuary inside the entrance has declined by about 12% since 1868. This study further estimated an 80% reduction in emergent vegetation production, and a 15% decline in benthic algal production. Sherwood *et al.* (1990) also analyzed early navigational charts and noted profound changes in the river entrance from year to year. The pre-development river mouth was characterized by shifting shoals, sandbars, and channels forming ebb and flood tide deltas. Prior to jetty construction, the navigable channel over the tidal delta varied from a single, relatively deep channel in some years to two or more shallow channels in other years.

Within the lower Columbia River, diking, river training devices (pile dikes and rip rap), railroads, and highways have narrowed and confined the river to its present location. Between the Willamette River and the mouth of the Columbia River, diking, flow regulation, and other human activities have resulted in a confinement of 84,000 acres of flood plain that likely contained large amounts of tidal marsh and swamp. The lower Columbia River's remaining tidal marsh and swamp habitats are located in a narrow band along the Columbia River and its tributaries' banks and around undeveloped islands.

Since the late 1800s, the Corps has been responsible for maintaining navigation safety on the Columbia River. During that time, the Corps has taken many actions to improve and maintain the navigation channel. The channel has been dredged periodically to make it deeper and wider, as well as annually for maintenance. To improve navigation and reduce maintenance dredging, the navigation channel has also been realigned and hydraulic control structures, such as in-water fills, channel constrictions, and pile dikes, have been built. Most of the present-day pile dike system was built in the periods 1917-23 and 1933-39, with an additional 35 pile dikes constructed between 1957 and 1967.

The existing navigation channel pile dike system consists of 256 pile dikes, totaling 240,000 linear feet. Ogden Beeman and Associates (1985) termed these Corps activities "river regulation", and noted that navigation channel maintenance activities, for a 100-year period prior to their 1985 report, required closing of river side channels, realigning river banks, removing rock sills, stabilizing river banks, and placement of river "training" features. Most of these baseline river training features and habitat alterations were constructed or occurred before any of the current ESA-listed salmon and steelhead were placed on the list of endangered and threatened species.

Flow regulation, water withdrawal and climate change have reduced the Columbia River's average flow and altered the seasonality of Columbia River flows, sediment discharge and turbidity, which have changed the estuarine ecosystem (Sherwood *et al.* 1990; Simenstad et al. 1990, 1992, Weitkamp 1995). Annual spring freshet flows through the Columbia River estuary are approximately one-half of the traditional levels that flushed the estuary and carried smolts to sea, and total sediment discharge is approximately one-third of 19th Century levels. For instance, flow regulation that began in the 1970s has reduced the 2-year flood peak discharge, as measured at The Dalles, Oregon, from 580,000 cubic feet per second (cfs) to 360,000 cfs (Corps 1999).

Decreased spring flows and sediment discharges have also reduced the extent, speed of movement, thickness, and turbidity of the plume that extended far out and south into the Pacific Ocean during the spring and summer (Cudaback and Jay 1996; Hickey *et al.* 1997). Changes in estuarine bathymetry and flow have altered the extent and pattern of salinity intrusion into the river and have increased stratification and reduced mixing (Sherwood et al. 1990).

These aforementioned physical changes also affect other factors in the riverine and estuarine environment. Tides raise and lower river levels at least 4 feet, and up to 12 feet twice every day. The historical range for tides was probably similar, but seasonal ranges and extremes in water surface elevations have certainly changed because of river flow regulation. The salinity level in areas of the estuary can vary from zero to 34 parts per thousand (ppt) depending on tidal intrusion, river flows, and storms. Flow regulation has affected the upstream limit of salinity intrusion. The salinity wedge is believed to have ranged from the river mouth to as far upstream as RM 37.5 in the past. It is now generally believed that the salinity intrusion ranges between the mouth and RM 30. The river bed within the navigation channel is composed of a continuously moving series of sand waves that can migrate up to 20 feet per day at flows of 400,000 cfs or greater, and at slower rates at lesser flows. This rate of river discharge is not experienced as often as it was prior to flow regulation in the Columbia River.

Development has changed the circulation pattern in the estuary and increased shoaling rates. Sediment input to the estuary has declined due to the altered hydrograph and the estuary is now a more effective sediment trap (Northwest Power Planning Council 1996). Although the Columbia River is characterized as a highly energetic system, it has been changing as a result of development and is now similar to more developed and less energetic estuaries throughout the world (Sherwood *et al.* 1990).

Water quality is another important aspect the environmental condition of the lower Columbia River and ecosystem that the potential to affect salmonid's growth and survival. The uptake of toxicants during juvenile salmonid residence in the lower Columbia River and estuary (NWFSC Environmental Conservation Division 2001) can affect their growth and survival. In field studies, juvenile salmon from sites in the Pacific Northwest show demonstrable effects, including immunosuppression, reduced disease resistance, and reduced growth rates, due to contaminant exposure during their estuarine residence (Arkoosh *et al.* 1991, 1994, 1998; Varanasi *et al.* 1993; Casillas *et al.* 1995a,b, 1998a).

Current environmental conditions in the Columbia River estuary indicate the presence of contaminants in the food chain of juvenile salmon and steelhead. Fish from a site near Sand Island, in the mouth of the Columbia River, whole body concentrations of dichlorodiphenyl trichloroethane (DDT) and polychlorinated biphenyls (PCB) were 44 ng/g wet wt (~ 220 ng/g dry wt) and 53 ng/g wet wt (~ 265 ng/g dry wt), respectively [NWFSC Environmental Conservation Division 2001]. The findings of elevated levels of DDTs and PCBs in stomach contents of fish from Sand Island, however, is clear evidence that fish are being exposed to these contaminants while they are in the estuary. Levels of DDTs in stomach contents were 52 ng/g wet weight, and levels of PCBs were 33 ng/g wet weight. Although the Sand Island samples were collected from a mixed population of hatchery and wild fish and it is likely that DDTs and PCBs in hatchery food make some contribution to contaminant body burdens, the values seen were among the highest levels measured at estuarine sites in Washington and Oregon. By comparison, in the Duwamish estuary, a heavily contaminated industrial estuary near Seattle, mean whole body DDT levels in juvenile chinook salmon were 25 ng/g wet wt (~125 ng/g dry wt) and whole body PCB levels were 68 ng/g wet wt (~340 ng/g dry wt)[NWFSC Environmental Conservation Division 2001.

More recently, additional samples were analyzed from salmon collections in 1999 and 2000 (NWFSC Environmental Conservation Division, 2001). These analyses show that concentrations of PCBs and DDTs are consistently elevated in chinook salmon collected from Sand Island in the mouth of the Columbia River. Measured concentrations of DDTs in salmon bodies ranged from 32 to 56 ng/g dry wt, and concentrations of PCBs ranged from 23 to 160 ng/g dry wt (NWFSC Environmental Conservation Division 2001). No significant differences in mean concentrations of either of these contaminants were found over the three years during which fish were sampled. Elevated levels of PCBs and DDTs were also consistently found in stomach contents of sampled fish, indicating that juvenile salmon caught near Sand Island are taking these contaminants up in their diet.

The concentrations of PCBs present in Sand Island fish are a cause for concern, because they are approaching or even exceeding estimated threshold tissue concentrations for adverse effects in salmonid fishes (Meador 2000). These values range from 120-360 ng/g dry wt for fish with total body lipid concentrations of 1-3%, which are typical of juvenile salmon collected within Pacific Northwest estuaries. At an average of 265 ng/g dry wt, PCB concentrations in Sand Island fish are well within the range of the effects threshold.

Available data suggest that exposure to polyaromatic hydrocarbons (PAH) may be quite variable in juvenile salmon from the lower Columbia River. In stomach contents of juvenile chinook salmon collected near Sand Island in 1998, PAH concentrations were barely detectable, below levels seen in salmon from moderately developed estuaries such as Yaquina Bay and Grays Harbor, and well below levels found in stomach contents of salmon from industrialized waterways of Puget Sound (NWFSC Environmental Conservation Division 2001). Similarly, concentrations of PAH metabolites in bile were relatively low in juvenile salmon from Sand Island in comparison to fish from urban Puget Sound sites (*e.g.*, the Duwamish and Hylebos Waterways) (NWFSC Environmental Conservation Division 2001). Juvenile salmon sampled near Sand Island in 2000, however, showed somewhat greater exposure to PAHs than salmon sampled in 1998. Concentrations of PAHs and their metabolites in both stomach contents and fish bile were considerably higher in 2000 than in 1998 (NWFSC Environmental Conservation Division 2001). Concentrations were still lower than those observed in fish from urban estuaries in Puget Sound, but were comparable to those observed in fish from moderately development estuaries along the Washington and Oregon coast, such as Yaquina Bay or Coos Bay.

These data indicate that juvenile salmonid fishes within the Columbia River estuary have contaminant body burdens that may already be within the range where sublethal effects may occur, although the sources of exposure are not clear.

All ESA-listed salmon and steelhead must pass through the lower Columbia River, estuary and river mouth twice: Once as juveniles en route to the Pacific Ocean, and again as adults when they return to spawn. The lower Columbia River and estuary serve three primary roles for out-migrating juveniles as they transition from shallow freshwater environments to the ocean possible: (1) A place where juvenile fish can gradually acclimate to salt water; (2) a feeding area (*i.e.*, main, and tidal channel, unvegetated shoals, emergent and forested wetlands, and mudflats) capable of sustaining increased growth rates; and (3) a refuge from predators while fish acclimate to salt water.

Thus, though the lower Columbia River and estuary is important to the survival and recovery of all ESA-listed salmon and steelhead, it is particularly important to ocean-type salmon. These stocks may be particularly sensitive to ecosystem changes because of their longer residence times and dependence on this portion of the river for growth and survival. In this consultation, NOAA Fisheries focused on ocean-type salmon as an indicator of the importance of the lower Columbia River and estuary to all ESA-listed salmon and steelhead. NOAA Fisheries focused on ocean-type salmon because they are an indicator of the most sensitive salmonid response to changes in estuary and river habitats.

Ocean-type salmon ESUs in the Columbia River include chinook ESUs (LCR, SR fall-run, and UWR) and CR chum salmon ESUs. These ESUs are the most likely to be affected by potential effects of the project, and thus are discussed in detail below. Ocean-type salmon migrate downstream to and through the estuary as subyearlings, generally leaving the spawning area where they hatched within days to months following their emergence from the gravel. Consequently, subyearlings commonly spend weeks to months rearing within the action area prior to reaching the size at which they migrate to the ocean.

Young salmon and steelhead must undergo a physiological transition and develop enough strength, energy, and reserve capacity to adapt to and survive the physical and biological challenges of the ocean environment, as well as to successfully obtain prey in that environment. Juvenile salmonid fishes appear to reach the threshold for this transitional state at a size of 70 to 100 mm. Before fish reach this size, their ocean survival would be difficult.

The first outbound migrants of the LCR fall-run chinook and chum may arrive in the action area as early as late February (Herrmann 1970; Craddock, *et al.* 1976; Healey 1980; Congleton *et al.* 1981; Healey 1982; Dawley *et al.* 1986; Levings *et al.* 1986). The majority of these fish are present from March through June. Outbound SR fall-run chinook begin their migration much farther upstream and arrive in the lower Columbia River approximately a month later.

Ocean-type subyearlings arrive in the lower river and estuarine portion of the action area at a small size. The earliest migrants can be as small as 30 to 40 mm fork length (*i.e.*, from snout to fork in the tail) when they arrive because some of these fish hatch only a short distance from the action area. Later spring migrants are generally larger, ranging up to 50 to 80 mm. Subyearlings from the mid-Columbia and Snake Rivers tend to be substantially larger (70 to 100 mm) by the time they reach the lower Columbia River. The larger size of the lower SR fall-run chinook, compared with the LCR chinook and chum, likely indicates some differences in suitable habitat. The larger subyearlings from the Snake River can likely use a greater range of depth and current conditions than the subyearlings of the LCR ESUs can.

Once ocean-type subyearlings arrive in the lower Columbia River, they may remain for weeks to months. Because these fish arrive small in size, they undergo extended lower river and estuary rearing before they reach the transitional size necessary to migrate into the ocean (70 to 100 mm). This larger size is necessary to deal with the physical conditions and predators they face in the ocean environment, as well as to be successful in obtaining prey in that environment. At growth rates of about 0.3 to 1 mm per day (Levy *et al.* 1979; Argue *et al.* 1985; Fisher and Pearcy 1990), the subyearlings require weeks to months to reach this larger size. During this time, young chinook increase by about 5 to 8 grams per day, or approximately 6% of their body weight (Herrmann 1970; Healey 1980).

Ocean-type subyearlings migrate through the riverine reach of the action area during their downstream migration (about 150 kilometers [km]). Because of this, many spend some time rearing within the riverine reach, however, there is considerable variability in the freshwater rearing period of subyearling populations. Some subyearlings spawned in the lower reaches of coastal tributaries migrate almost immediately to marine areas following emergence from the gravel. Other subyearlings rear in freshwater for weeks to months, particularly those spawned well upstream in larger river systems such as the Columbia. The migration rate for subyearlings undergoing the rearing migration through the riverine reach is likely to be a few to ten km per day. Subyearlings migrating directly to the estuary migrate at rates of 15 to 30 km per day (MacDonald, 1960; Simenstad *et al.*, 1982; MacDonald *et al.*, 1987; Murphy *et al.*, 1989; Fisher and Pearcy, 1990). Adult salmon returning to the Columbia River migrate through the river mouth throughout the year. The majority move through this area from early spring through autumn.

A number of physical characteristics in the riverine reach affect the quality and quantity of habitat available for salmon and steelhead. These include the availability of prey, temperature, turbidity, and suspended solids. Subyearlings are commonly found within a few meters of the shoreline at water depths of less than 1 meter. Although they migrate between areas over deeper water, they generally remain close to the water surface and near the shoreline during rearing, favoring water no more than 2 meters deep and areas where currents do not exceed 0.3 meter per second. They seek lower energy areas where waves and currents do not require them to expend considerable energy to remain in position while they consume invertebrates that live on or near the substrate. These areas are characterized by relatively fine grain substrates. However, it is not uncommon to find young salmonid fishes in areas with steeper and harder substrates, such as sand and gravel.

Young chinook in the lower Columbia action area consume a variety of prey—primarily insects in the spring and fall and *Daphnia* from July to October (Craddock *et al.*, 1976). *Daphnia* are the major prey during the summer and fall months, selected more than other planktonic organisms. Young salmon and steelhead consume *diptera, hymenoptera, coleoptera, tricoptera, and ephemeroptera* in the area just upstream from the estuary (Dawley *et al.*, 1986). Bottom and Jones (1990) recently reported that young chinook ate primarily *Corophium, Daphnia*, and insects, with *Corophium* being the dominant prey species in winter and spring and *Daphnia* the dominant prey species in summer. Salmon and steelhead commonly feed on *Corophium* males, which apparently are more readily available than the larger females.

Corophium is commonly discussed as a primary prey item of juvenile salmonid fishes in the lower Columbia River. *Corophium salmonis* is a euryhaline species tolerating salinities in the range of zero to 20 ppt (Holton and Higley, 1984). As shown by the above investigations, it is one of several major prey species consumed by juvenile chinook under existing conditions. No data are available that indicate its historical role in the diet of Columbia River salmon prior to substantial modification of the river system. Nutritionally, *Corophium* may not be as desirable as other food sources for young salmon. According to Higgs *et al.* (1995), *gammarid* amphipods such as *Corophium* are high in chitin and ash and low in available protein and energy relative to *daphnids* and *chironomid* larvae.

Subyearling chinook and chum first enter the estuary at about the same time that they enter the riverine potion of the lower Columbia River because some of the fry move rapidly to the estuary by mid-March rather than rearing in the riverine areas (Craddock *et al.*, 1976; Dawley *et al.*, 1986; Levy and Northcote, 1982; Healey, 1982; Hayman *et al.*, 1996). As chinook fry migrate to the estuary, they may remain in the low salinity or even freshwater areas for some time until they have grown somewhat larger (more than 75 mm) (Kjelson *et al.* 1982; Levings *et al.* 1986; Shreffler *et al.* 1992; Hayman *et al.* 1996). However, some chinook fry appear to move immediately to the outer edges and higher salinity portions of the estuary (Stober *et al.* 1971; Kask and Parker 1972; Sibert 1975; Healey 1980; Johnson *et al.* 1992; Beamer *et al.* 2000).

Ocean-type fish commonly have the capacity to adapt to highly saline waters shortly after emergence from the gravel. Tiffan *et al.* (2000) determined that once active migrant fall chinook passed McNary Dam 470 km upstream from the Columbia River's mouth, 90% of the subyearlings were able to survive challenge tests in 30 ppt seawater at 18.3˚ C. Other investigators have found that very small chinook fry are capable of adapting to estuarine salinities within a few days (Ellis 1957; Clark and Shelbourn 1985). Wagner *et al.* (1969), found that all fall chinook alevins tested were able to tolerate 15 to 20 ppt salinity immediately after hatching.

While tidal exchange with the ocean tends to keep estuary temperatures at moderate levels (ten to 20˚ C) throughout the time the out-migrants are present, spring and summer temperatures vary widely in shallow water when tidal flats are exposed by low tides during sunny midday periods. Consequently, young salmonid fishes rearing in shallow water naturally experience a wide range of temperatures within periods of less than a day. The available observations of the behavioral reaction of young salmonid fishes to temperatures in estuarine conditions are variable. Bessey (1976) found hatchery chinook and wild chum avoided water of 16° C. These fry responded immediately to increases of less than 1° C; however, the fry did not avoid rapid increases of more than 1° C per minute. Temperatures in the estuarine reach may range from zero to 26° C, but 12° to 14° C is optimum for young salmon (Bottom *et al.* 2001).

In the estuary, turbidity is important in relation to the ETM zone. Relatively high turbidity is a characteristic of the intermixing of freshwater and saltwater in the ETM. However, Jones, et al. (1990), concluded that, in the lower Columbia River, the standing stocks of benthic animals were highest in the protected tidal flat habitats, while those of epibenthic and zooplanktonic organisms were concentrated within the ETM. Because prey species have differing tolerances for salinity, increased salinity in the estuary results in different prey species being available to the rearing fry than those in the freshwater riverine reach, and in a change in the abundance of those prey species that are found in both the estuarine and riverine reaches.

In addition, young salmonid fishes in the estuary continue to eat many of the same organisms as are consumed in the riverine reach of the lower Columbia River, but there are shifts in prey abundance. Young chinook and chum at Miller Sands in the upper estuarine reach feed primarily on the pelagic prey *Daphnia longispina* and *Eurytemora hirundoides*, the benthic prey *Corophium salmonis*, and *chironomid* larvae and pupae (McConnell *et al.* 1978). Diet overlaps considerably among the different species. Many yearlings passing through the lower river were found to have empty or less than full stomachs (Dawley *et al.* 1986).

As young salmonids leave the estuary, they migrate through the river mouth. At the river's mouth, there tends to be more wave and current energy than other portion of the estuary. The ocean area immediately outside the river mouth is characterized by high salinity during low to moderate flows and by high wave energy with no shoreline for protection. It is likely that young salmonids pass through the river mouth from March through the autumn months during the same time they are present in the estuary. Some individuals may migrate out of the estuary early and other late in the general migration period of each ESU.

2.1.3 Analysis of Effects

2.1.3.1 Effects of Proposed Actions

Pile Installation - Effects of Increases in Acoustic Energy
High-intensity sounds may temporarily or permanently damage the hearing of fish. Sound pressure and particle are essentially the same. However, within a distance of ½ p (sound pressure) (1 = wavelength) from the sound source the wavefront is spherical rather than a plane surface, and particle velocity is much higher for a given sound pressure—the near-field effect. The near-field effect can extend up to 50 meters from the source for low frequencies such as 5 Hz, which is perceivable by many fish (Feist *et al.* 1992).

The hearing ability of fish such as salmonids and flatfish is limited in bandwidth and intensity compared to other teleots (Hawkins and Johnstone 1978). These fish lack the physical connection between their swimbladder and the inner ear that *Ostariophysan* fishes possess (Hawkins 1986). Fish with this type of hearing are most sensitive to particle velocity since the otoliths in the legena and sacclus essentially respond to particle displacement (Hawkins and MacLennan 1976). Sound produced by a pile driving rig are audible to juvenile Pacific salmon from more than 593 meters from the source (Feist 1992). Feist *et al.* (1992) also reported that fish in close proximity (<10 meters) to a pile being driven will experience temporary or permanent hearing loss.

Literature on fish hearing clearly demonstrates that fish detect and respond to sounds in their environmnet (Hawkins 1986). Fish appear to us sound to locate prey, for social interaction, and to signal the presence of danger (Feist *et al.* 1992). Feist *et al.* (1992) reported sound pressure levels increased up to 25 db above ambient levels from pile driving, at a range of 593 meters from the source at a depth of 1.5 meters. Analysis of the sound field at 593 meters showed significant acoustic energy between 200 and 400 Hz, and sound levels were at least 20 dB above ambient levels. Broad-band, pulsed sound rather than continuous, pure tone sounds are more effective at altering fish behavior (Hering 1968). The sounds produced by pile driving are pulsed and broad-band.

Another effect of pile driving is auditory masking. Ambient noise should be at least 24dB less than the minimum aubible field of the fish; otherwise masking will occur (Hawkins and Johnstone 1978). Therefore, pile driving noise is likely to masks the sounds of approaching predators making them more difficult to detect by juvenile salmonid fishes.

Water Quality - Total Suspended Solids and Turbidity

The effects of pile removal, and to a lesser extent, pile installation, is likely to temporarily increase concentrations of TSS. Potential effects of exposure to increased concentrations in TSS on OC coho salmon include, but are not limited to: (1) Reduction in feeding rates and growth, (2) increased mortality, (3) physiological stress, (4) behavioral avoidance, (5) reduction in macroinvertebrate populations, and (6) temporary beneficial effects. Influences of TSS and turbidity (defined as a measurement of relative clarity due to an increase in undissolved particles [suspended solids]), on fish reported in the literature range from beneficial to detrimental. Potential beneficial effects include a reduction in piscivorous fish/bird predation rates, enhanced cover conditions, and improved survival conditions.

Turbidity, at moderate levels, has the potential to reduce primary and secondary productivity, and at high levels, has the potential to interfere with feeding and to injure and kill adult and juvenile fish (Spence *et al.* 1996, Bjornn and Reiser 1991). Other behavioral effects on fish, such as gill flaring and feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985). Fine, redeposited sediments also have the potential to reduce primary and secondary productivity (Spence *et al.* 1996), and to reduce incubation success and interstitial rearing space for juvenile salmon and steelhead (Bjornn and Reiser 1991).

Salmonid fishes have been observed to move laterally and downstream to avoid turbid plumes (Sigler *et al.* 1984, Lloyd 1987, Servizi and Martens 1991). Juvenile salmonid fishes tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, except when the fish must traverse these streams along migration routes (Lloyd *et al.* 1987). In addition, a potential positive effect is providing refuge and cover from predation: Fish that remain in turbid waters experience a reduction in predation from piscivorous fish and birds (Gregory and Levings 1998). In habitats with intense predation pressure, this provides a beneficial trade-off (*e.g.*, enhanced survival) to the cost of potential physical effects (*e.g.*, reduced growth).

Exposure duration is a critical determinant of the occurrence and magnitude of physical or behavioral effects (Newcombe and MacDonald 1991). Salmonid fishes have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with floods, and are adapted to such high pulse exposures. Adult and larger juvenile salmonid fishes appear to be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjomn and Reiser 1991). However, chronic exposure can cause physiological stress that can increase maintenance energy and reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991). Increases in TSS can adversely affect filter-feeding macroinvertebrates and fish feeding. At concentrations of 53 to 92 ppm (24 hours) Gammon (1970) reported reductions in macroinvertebrate populations. At concentrations of 250 ppm (1 hour) Noggle (1978) reported a 95% reduction in feeding rates in juvenile coho salmon. At concentrations of 1200 ppm (96 hours) mortality to juvenile coho salmon was reported (Noggle 1978). Concentrations of 53.5 ppm (12 hours) caused physiological stress and changes in behavior in coho salmon (Berg 1983).

Concentrations and exposure times from in-water work activities that meet or exceed these effect levels are reasonably certain to harm or kill the subject species present in the action area. The subject species are likely to avoid waters that are chronically turbid, and therefore adverse effects are less likely after initial exposure.

Water Quality Contamination from Removal of Treated Wood
Sediments in the action area are likely contaminated with elevated concentrations of copper and PAHs, and probably many other creosote components (see section 2.1.2.2). Removal of treated wood pilings may adversely affect the subject species due to resuspension of contaminated sediments into the Columbia River.

Migration of creosote and its components (*e.g.*, copper and PAHs) from treated wood in lotic environments may adversely affect juvenile salmonid fishes (NMFS 1998). Copper is the main metal of concern because it is the most acutely toxic. Copper also leaches the most readily, followed by arsenic and chromium (Warner and Solomon 1990). Creosote contains over 300 compounds, including a variety of PAHs. Some PAHs are very toxic and bioconcentrate (NMFS 1998). Potential effects of elevated water column and sediments concentrations of copper and PAHs to the subject species include, but are not limited to: (1) Reduced growth and survival rates; (2) altered hematology; and (3) reproductive effects, including reduced frequency of spawning, reduced egg production, and increased deformities in fry (Sorensen 1991, Eisler 1998).

Construction Equipment
As with all construction activities, accidental release of fuel, oil, and other contaminants may occur. Operation of pile driving equipment requires the use of fuel, lubricants, etc., which if spilled into a water body could injure or kill aquatic organisms. Petroleum-based contaminants (such as fuel, oil, and some hydraulic fluids) contain PAHs which can cause acute toxicity to salmonid fishes at high levels of exposure and can also cause chronic lethal as well as acute and chronic sublethal effects to aquatic organisms (Neff 1985).

2.1.3.2 Effects on Critical Habitat

NOAA Fisheries designates critical habitat based on physical and biological features that are essential to the listed species. Essential features of designated critical habitat include substrate, water quality, water quantity, water temperature, food, riparian vegetation, access, water velocity, space and safe passage. Effects to critical habitat from these categories are included in the effects description expressed above in section 2.1.3.

2.1.3.3 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as those effects of "future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. Therefore, these actions are not considered cumulative to the proposed action.

NOAA Fisheries is not aware of any specific future non-federal activities within the action area that would cause greater effects to listed species than presently occur. NOAA Fisheries assumes that future private and state actions will continue at similar intensities as in recent years. As the human population in the state continues to grow, demand for actions similar to the subject project likely will continue to increase as well. Each subsequent action by itself may have only a small incremental effect, but taken together they may have a significant effect that would further degrade the watershed's environmental baseline and undermine the improvements in habitat conditions necessary for listed species to survive and recover.

2.1.4 Conclusion

NOAA Fisheries has concluded that the Port of Astoria Mobile Boat Hoist\Haulout Facility Project is not likely to jeopardize the continued existence of SR steelhead, UCR steelhead, MCR steelhead, UWR steelhead, LCR steelhead, SR spring/summer-run chinook salmon, SR fall-run chinook salmon, UCR spring-run chinook salmon, UWR chinook salmon, LCR chinook salmon, CR chum salmon, or SR sockeye salmon, and is not likely to destroy or adversely modify designated critical habitat for SR fall-run chinook salmon, SR spring/summer-run chinook salmon, and SR sockeye salmon.

In reaching this conclusion, NOAA Fisheries used the best available scientific and commercial data to apply its jeopardy analysis, and analyzed the effects of the proposed action on the biological requirements of the species relative to the environmental baseline, together with cumulative effects. The proposed action is reasonably certain to cause short-term degradation of critical habitat due to changes in water quality. The proposed action is reasonably certain to cause adverse effects to juvenile salmonid fishes within 593 meters of the project area from temporary increases in acoustic energy. The incorporation of best management practices (BMPs) into the proposed action, and limiting all in-water work activities to February 12 through February 28 will minimize adverse effects to ESA-listed species and their critical habitats. Based on the biological information in section 2.1.1, and the incidental take in section 2.2, the proposed action would not appreciably diminish ESA-listed Pacific salmon or steelhead reproduction, numbers, or distribution at the subpopulation or ESU scales.

2.1.5 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitats, or to develop additional information. The NOAA Fisheries believes the following conservation recommendations are consistent with these obligations, and therefore should be carried out by the Corps forlower Columbia River dredging activities conducted under Corps authorization:

1. The Corps should reassess the potential effects of contaminants, including sublethal effects and bioaccumulation, on salmonid fishes and benthic prey species from resuspension of contaminated sediments.

In order for the NOAA Fisheries to be kept informed of actions minimizing or avoiding adverse effects, or those that benefit listed salmon and their habitats, NOAA Fisheries requests notification of any actions leading to the achievement of the conservation recommendation.

2.1.6 Reinitiation of Consultation

This concludes formal consultation on these actions in accordance with 50 CFR 402.14(b)(1). Reinitiation of consultation is required: (1) If the amount or extent of incidental take is exceeded; (2) the action is modified in a way that causes an effect on the listed species that was not previously considered in the biological assessment and this Opinion; (3) new information or project monitoring reveals effects of the action that may affect the listed species in a way not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

2.2 Incidental Take Statement

Section 9 and rules promulgated under section 4(d) of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. "Harass" is defined as actions that create the likelihood of injuring listed species by annoying it to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. "Incidental take" is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

2.2.1 Amount or Extent of Take

NOAA Fisheries anticipates that the proposed action covered by this Opinion is reasonably certain to result in incidental take of listed species resulting from changes in water quality and temporary increases in acoustic energy. Effects of actions such as these are largely unquantifiable in the short term, but are expected to be largely limited to non-lethal take in the form of behavior modification.

Therefore, even though NOAA Fisheries expects some low level of non-lethal incidental take to occur due to the action covered by this Opinion, the best scientific and commercial data available are not sufficient to enable NOAA Fisheries to estimate a specific amount of incidental take to the species themselves. In instances such as this, NOAA Fisheries designates the expected level of take in terms of the extent of take allowed. Therefore, NOAA Fisheries limits the area of allowable incidental take during construction to that aquatic area within 500 meters of the mobile boat hoist\haulout facility. Incidental take occurring beyond this area is not authorized by this consultation. This incidental take statement terminates on February 28, 2003.

2.2.2 Reasonable and Prudent Measures

NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of the above species.

The Corps shall ensure that:

1. The amount and extent of incidental take from construction activities is minimized by ensuring that in-water work is limited to the time when effects to all ESA-listed species in the Columbia River basin would be minimized.

2. The potential for contamination of riverine habitat from removal of treated wood is minimized.

3. The amount and extent of incidental take from the proposed actions is minimized by ensuring that the conservation measures included in the consultation request are fully implemented

4. The disturbance to near-shore habitat features is minimized, or where effects are unavoidable, near-shore habitat features are restored.

5. All construction equipment is operated and stored in a manner that minimizes discharge of toxics into the Columbia River.

6. The disturbance to riverine habitats from use of barges for construction activities is minimized.
7. The disturbance to salmon and steelhead from acoustic energy created by pile driving is minimized.

8. The reasonable and prudent measures, in-water work, near-shore and riparian habitats, proposed action, staging of equipment are monitored and evaluated both before and during project implementation.

2.2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for each category of activity.

1. To implement reasonable and prudent measure #1 (in-water work), the Corps shall ensure that:
   a. All work shall take place during February 12 through February 28.
      No in-water work shall take place outside the in-water work period without prior written authorization from NOAA Fisheries.
   b. River bottom elevations are not increased (*i.e.*, no excavation or dredging).
   c. If a dead, injured, or sick endangered or threatened species specimen is located, initial notification must be made to the NOAA Fisheries Law Enforcement Office, at the Vancouver Field Office, 600 Maritime, Suite 130, Vancouver, Washington 98661; phone: 360.418.4246. Care should be taken in handling sick or injured specimens to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered and threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed.

2. To implement reasonable and prudent measure #2 (treated wood), the Corps shall ensure that:
   a. Care must be taken to ensure that no treated wood debris falls into the water. If treated wood debris does fall into the water, it must be removed immediately.
      i. Treated wood pilings will be removed with the following conditions:
         (1) Pilings must be dislodged with a vibratory hammer.
         (2) Once loose, the pilings must be placed onto the construction barge or other appropriate dry storage location, and not left in the water or piled onto the river bank.
         (3) If pilings break during removal, the stump must be removed by breaking or cutting 3 feet below the sediment surface, then covered with a substrate appropriate for the site.
      ii. All treated wood removed during a project must be disposed of at a facility approved for hazardous materials of this classification.

3. To implement reasonable and prudent measure #3, (conservation measures), the Corps shall ensure that:
   a. The proposed conservation measures are fully implemented.

b. A pollution and erosion control plan will be prepared and carried out to prevent pollution related to construction operations. The plan must be available for inspection on request by NOAA Fisheries.

c. The pollution and erosion control plan must contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations:

   (1) Practices to prevent erosion and sedimentation associated with construction sites, equipment and material storage sites, fueling operations and staging areas.

   (2) A description of any hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

   (3) A spill prevention containment and control plan withnotification procedures, specific cleanup and disposal instructions for different products, quick response containment and cleanup measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

   (4) Practices to prevent construction debris from dropping into any stream or water body, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.

4. To implement reasonable and prudent measure #4 (near-shore habitats), above, the Corps shall ensure that:

   a. The alteration or disturbance of near-shore habitat is minimized.

   b. All disturbed near-shore habitats shall be restored using natural techniques and materials, *i.e.*, native submergent vegetation.

5. To implement reasonable and prudent measure # 5 (staging of equipment), the Corps shall ensure that:

   a. Vehicles operated within 150 feet of top-of-bank are free of fluid leaks. Vehicles will be examined daily for leaks.

   b. Vehicle staging, maintenance, refueling, and fuel storage areas, will be at least 150 feet from top-of-bank.

   c. At the end of each work shift, vehicles will be stored no less than 150 feet (horizontal distance) from top-of -bank.

   d. No pollutants of any kind (*i.e.*, petroleum products) will come in contact with the area below the mean high tide.

6. To implement reasonable and prudent measure #6 (barge use), the Corps shall ensure that any barge used maintains a minimum water depth of 10 feet between the bottom of the barge and the river bottom.

7. To implement reasonable and prudent measure #7 (acoustic energy), the Corps shall ensure that acoustic energy from pile driving is attenuated to ambient levels at 500 meters or less from the project area.

8. To Implement Reasonable and Prudent Measure #8, above, (monitoring), the Corps shall ensure that:
   a. Within 60 days of completing the project, the applicant will submit a monitoring report to NOAA Fisheries describing the applicant's success meeting their permit conditions. This report will consist of the following information.
   b. The post-construction monitoring report describes the success and/or failure, and actions taken to correct failures of all conservation measures and confirmation of as-built condition. These reports will be submitted as outlined below.
      i. Post-construction Report. A report on implementation of conservation measures, effects of construction activities on the subject species and critical habitat, and as-built components shall be provided within 60 days following completion of the proposed action.
      ii. The Post-construction report shall include a description of:
         (1) The downstream extent and duration of any turbidity plume observed, to include extent, duration, and frequency of any turbidity plumes related to project activities.
         (2) Specific methods used to minimize sediment mobilization and increases in turbidity.
         (3) Any observed injury and/or mortality of fish resulting from project activities.
   c. A copy of the pollution control inspection reports, a description of any accidental spills of hazardous materials, and efforts made to control accidental spills.
   d. The monitoring report shall be submitted to:

      National Marine Fisheries Service
      Habitat Conservation Division
      Attn: OHB2002-0302-FEC
      525 NE Oregon Street, Suite 500
      Portland, OR 97232

3. MAGNUSON-STEVENS ACT

3.1 Background

On November 29, 2002, the National Marine Fisheries Service (NOAA Fisheries) received a letter from the U.S. Army Corps of Engineers (Corps) requesting requesting EFH consultation for the subject action pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations (50 CFR 600). NOAA Fisheries responded with a letter of nonconcurrence on December 19, 2002, that consultation could not be completed until additional information was provided. On February 6, 2002, NOAA Fisheries received a letter from the Corps revising the proposed action and providing the requested information. NOAA Fisheries considered the information sufficient to initiate formal consultation. The objective of the EFH consultation is to determine whether the proposed action may adversely affect designated EFH for relevant species, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the proposed action.

3.2 Magnuson-Stevens Fishery Conservation and Management Act

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH.

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of essential fish habitat: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.110).

Section 305(b) of the MSA (16 U.S.C. 1855(b)) requires that:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH;
- NOAA Fisheries shall provide conservation recommendations for any Federal or state activity that may adversely affect EFH;
- Federal agencies shall within 30 days after receiving conservation recommendations from NOAA Fisheries provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall explain its reasons for not following the recommendations.

The MSA requires consultation for all actions that may adversely affect EFH, and does not distinguish between actions within EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies undertaking, permitting or funding activities that may adversely affect EFH, regardless of their locations.

3.3 Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for Federally-managed fisheries within the waters of Washington, Oregon, and California. The designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (200 miles) (PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (*e.g.*, natural waterfalls in existence for several hundred years) (PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone offshore of Washington, Oregon, and California north of Point Conception to the Canadian border.

Detailed descriptions and identifications of EFH for the groundfish species are found in the Final Environmental Assessment/Regulatory Impact Review for Amendment 11 to *The Pacific Coast Groundfish Management Plan* (PFMC 1998a) and the NOAA Fisheries *Essential Fish Habitat for West Coast Groundfish Appendix* (Casillas *et al.* 1998). Detailed descriptions and identifications of EFH for the coastal pelagic species are found in Amendment 8 to the *Coastal Pelagic Species Fishery Management Plan* (PFMC 1998b). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the *Pacific Coast Salmon Plan* (PFMC 1999). Assessment of the potential adverse effects to these species' EFH from the proposed action is based on this information.

3.4 Proposed Actions

The proposed action is detailed above in section 1.2 of this document. The action area includes the Columbia River from river mile 13.0 to river mile 12.0, and includes the channel migration zone. This area has been designated as EFH for various life stages of numerous groundfish, coastal pelagic fish, and salmon species (Table 2).

3.5 Effects of Proposed Action

As described in detail in section 2.1.3 of this document, the proposed is likely to temporarily degrade water quality, river substrate, and near-shore habitat for ground fish species, chinook and coho salmon, and coastal pelagic species.

3.6 Conclusion

NOAA Fisheries believes that the proposed action may adversely affect the EFH for the groundfish, Pacific salmon species, and coastal pelagic listed in Table 2.

3.7 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the Magnuson-Stevens Act, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. The conservation measures proposed for the project by the Corps, all conservation recommendations outlined above in section 2.1.5 and all of the reasonable and prudent measures and the terms and conditions contained in sections 2.2.2 and 2.2.3 are applicable to salmon EFH. Therefore, NOAA Fisheries incorporates each of those measures here as EFH conservation recommendations.

3.8 Statutory Response Requirement

Please note that the MSA (section 305(b)) and 50 CFR 600.920(j) requires the Federal agency to provide a written response to NOAA Fisheries after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset the adverse impacts of the activity on EFH. If the response is inconsistent with a conservation recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

3.9 Supplemental Consultation

The Corps must reinitiate EFH consultation with NOAA Fisheries if either action is substantially revised or new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920).

Table 2. Species with designated EFH found in waters of the State of Oregon.

Ground Fish Species	Blue rockfish (*S. mystinus*)	Rougheye rockfish (*S. aleutianus*)	Flathead sole (*Hippoglossoides elassodon*)
Leopard shark (*Triakis semifasciata*)	Bocaccio (*S. paucispinis*)	Sharpchin rockfish (*S. zacentrus*)	Pacific sanddab (*Citharichthys sordidus*)
Soupfin shark (*Galeorhinus zyopterus*)	Brown rockfish (*S. auriculatus*)	Shortbelly rockfish (*S. jordani*)	Petrale sole (*Eopsetta jordani*)
Spiny dogfish (*Squalus acanthias*)	Canary rockfish (*S. pinniger*)	Shortraker rockfish (*S. borealis*)	Rex sole (*Glyptocephalus zachirus*)
Big skate (*Raja binoculata*)	Chilipepper (*S. goodei*)	Silvergray rockfish (*S. brevispinus*)	Rock sole (*Lepidopsetta bilineata*)
California skate (*R. inornata*)	China rockfish (*S. nebulosus*)	Speckled rockfish (*S. ovalis*)	Sand sole (*Psettichthys melanostictus*)
Longnose skate (*R. rhina*)	Copper rockfish (*S. caurinus*)	Splitnose rockfish (*S. diploproa*)	Starry flounder (*Platyichthys stellatus*)
Ratfish (*Hydrolagus colliei*)	Darkblotched rockfish (*S. crameri*)	Stripetail rockfish (*S. saxicola*)	
Pacific rattail (*Coryphaenoides acrolepsis*)	Grass rockfish (*S. rastrelliger*)	Tiger rockfish (*S. nigrocinctus*)	**Coastal Pelagic Species**
Lingcod (*Ophiodon elongatus*)	Greenspotted rockfish (*S. chlorostictus*)	Vermillion rockfish (*S. miniatus*)	Northern anchovy (*Engraulis mordax*)
Cabezon (*Scorpaenichthys marmoratus*)	Greenstriped rockfish (*S. elongatus*)	Widow Rockfish (*S. entomelas*)	Pacific sardine (*Sardinops sagax*)
Kelp greenling (*Hexagrammos decagrammus*)	Longspine thornyhead (*Sebastolobus altivelis*)	Yelloweye rockfish (*S. ruberrimus*)	Pacific mackerel (*Scomber japonicus*)
Pacific cod (*Gadus macrocephalus*)	Shortspine thornyhead (*Sebastolobus alascanus*)	Yellowmouth rockfish (*S. reedi*)	Jack mackerel (*Trachurus symmetricus*)
Pacific whiting (Hake) (*Merluccius productus*)	Pacific Ocean perch (*S. alutus*)	Yellowtail rockfish (*S. flavidus*)	Market squid (*Loligo opalescens*)
Sablefish (*Anoplopoma fimbria*)	Quillback rockfish (*S. maliger*)	Arrowtooth flounder (*Atheresthes stomias*)	
Aurora rockfish (*Sebastes aurora*)	Redbanded rockfish (*S. babcocki*)	Butter sole (*Isopsetta isolepsis*)	**Salmon**
Bank Rockfish (*S. rufus*)	Redstripe rockfish (*S. proriger*)	Curlfin sole (*Pleuronichthys decurrens*)	Coho salmon (*O. kisutch*)
Black rockfish (*S. melanops*)	Rosethorn rockfish (*S . helvomaculatus*)	Dover sole (*Microstomus pacificus*)	Chinook salmon (*O. tshawytscha*)
Blackgill rockfish (*S. melanostomus*)	Rosy rockfish (*S. rosaceus*)	English sole (*Parophrys vetulus*)	

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